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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,896	04/21/2005	Yasufumi Asao	03500.017697.	5799

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EXAMINER	
JOSEPH, DENNIS P	

ART UNIT	PAPER NUMBER
2629	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/531,896	ASAO ET AL.
	Examiner	Art Unit
	DENNIS P. JOSEPH	2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 December 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,5,7-9 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,5,7-9 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/20/2010*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is responsive to amendments for No. 10/531,896 filed on December 20, 2010. Claims 1, 4, 5 and 7-9 and 21 are pending and have been examined.

Continued Examination

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 20, 2010 has been entered.

Claim Objections

3. **Claims 1 and 21** objected to because of the following informalities: It recites throughout the claim of a first-sub-pixel and a second-sub-pixel. However, In the preamble, there is no hyphen between the first/second and the sub parts, so for the sake of clarity, appropriate correction would be appreciated, thank you. Similar issues exist in Claim 21.

Claim 1 also recites therein "wherein plural chromatic colors of light including red and blue and not including green pass through the first sub-pixel in response to **the changing** the applied voltage within the first sub-pixel, **chromatic-modulation voltage range**"

For “the changing” part, this seems to be a typo, perhaps “to the changing of”, or something like that? For the “chromatic-modulation voltage range”, this is after the comma and the end of the limitation. Respectfully, it seems to be missing a further limitation, or is the comma not meant to be there? Appropriate clarification is appreciated, thank you. Similar issues exist in Claim 21.

Claim Rejections – 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in Graham **v.** John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. **Claims 1, 4, 5 and 7-9 and 21** rejected under 35 U.S.C. 103(a) as being unpatentable over Ben-David et al. (US 2004/0174389 A1) in view of Nishino (US 5,680,184).

Ben-David teaches in Claim 1:

A color display element comprising a unit pixel which is comprised of a plurality of sub-pixels comprising a first sub-pixel and a second sub- pixel, the second sub-pixel having a green color filter (**Figures 12A/12B, [0085]-[0087] disclose RGB sub-pixels in row A with a corresponding CMY sub-pixels in row B. It is designed so that the G sub-pixel corresponds to the M sub-pixel. For purposes of interpretation, please read the first sub-pixel as the magenta sub-pixel and the second sub-pixel as the green sub-pixel. Also, please see various disclosures in Ben-David with regards to the filters on the green sub-pixel, such as [0011]**),

wherein the color display element has a means of applying a voltage to each of the sub-pixels (**Respectfully, this is obvious in a voltage driven display such as an LCD. [0059] discloses that the transmittance (related to intensity level) is dependent on the voltage applied to the sub-pixels**),

wherein the liquid crystal layer of the first sub-pixel changes the brightness of light passing therethrough in response to a change in voltage applied thereto in a first sub-pixel brightness-modulation voltage range, wherein plural chromatic colors of light including red and blue and not including green pass through the first sub-pixel in response to the changing the applied voltage within the first sub-pixel, (**As discussed above, modulation by applying a voltage is suggested in [0059] and again, is obvious in an LCD. Differences in voltages account for differences in brightness, at least in part. As for the range of chromatic colors for this first sub-pixel, it is well known that magenta is represented as red and blue (hence why it corresponds to the green sub-pixel as a pair, so they can make white). Thus, this sub-pixel is capable of red and blue color outputs. Also, please note that chromatic and achromatic colors and being able to produce at these boundaries is capable given Ben-**

David's CIE charts, such as Figures 5A/5B), and

wherein the liquid crystal layer of the second sub-pixel with the green color filter changes the brightness of light passing therethrough in response to a change in voltage applied thereto in a second sub-pixel, wherein the light passing through the liquid crystal layer of the second sub-pixel is achromatic when the voltage is in the second sub-pixel, brightness-modulation voltage range (**As discussed above, modulation by applying a voltage is suggested in [0059] and again, is obvious in an LCD. Differences in voltages account for differences in brightness, at least in part. The second sub-pixel is the green sub-pixel as noted above. Also, please note that chromatic and achromatic colors and being able to produce at these boundaries is capable given Ben-David's CIE charts, such as Figures 5A/5B and please note the combination below**); but

Ben-David does not teach "wherein the liquid crystal layer of the first sub-pixel changes the color of light passing therethrough in response to a change in voltage applied in a first sub-pixel, chromatic-modulation volage range, which modulates the retardation of the liquid crystal layer of the first sub-pixel" and also does not explicitly teach of the liquid crystal layer having a retardation capability, which causes changes the chromatic-modulation and brightness-modulation processes.

However, in liquid crystal displays, it is obvious, if not inherent, that the LCD layer is deformed (read as retarded) with respect to the molecules when a voltage is applied to it. Respectfully, this is standard in a liquid crystal display. Furthermore, several types of LCDs, such as ECB and

twisted nematic displays, often have this retardation ability as a key part of the invention, as well as being able to change the color of a sub-pixel by varying the voltage to the unit. It is further known that these various types of LCDs can reasonably be combined/manipulated to incorporate the teachings of various types of LCDs with other ones and Ben-David's is a generic type, i.e, doesn't teach away from a specific type.

To emphasize, in the same field of endeavor, liquid crystal displays, Nishino teaches of a birefringence type LCD which has two retardation plates which may be used as part of the color adjusting optical elements, (Nishino, Column 2, Lines 50-54). In this paragraph, the deformation, causing the refractive index changes, results in a change in thickness and a different color can be selected, as well as the brightness being changed for a particular color. Respectfully, the same voltage can be used to change the brightness and at certain voltage levels, change the color, as is obvious. Please see Figure 3 which shows the different voltage ranges associated with the various colors. Nishino is concerned with pixel units, but as one of ordinary skill in the art would realize, this could be applied to a sub-pixel structure as well, especially given the advances in pixel technology. Combined with Ben-David, there is a teaching of retarding the liquid crystal layer with the purpose of applying a voltage to both change the brightness of the selected color (as is readily known in the art) as well as being able to change the color (Nishino's teaching to reinforce something known in the art). Also please note that this is being applied to the first sub-pixel of Ben-David as the claim language calls for only that sub-pixel to undergo a color change, so Ben-David's first sub-pixel structure can be replaced with Nishino's pixel structure with brightness/color control without the need of a color filter, a solution Nishino seeks.

Several KSR principles can be applied here, such as known technique (the retarding of the LCD layer is well known when applying voltages to effect color changes in the pixels), simple substitution of parts (being able to implement a known driving technique without destroying the combination), teaching/suggestion/motivation in the prior arts (the retardation suggestions by Nishino), etc.

Therefore it would be obvious to one of ordinary skill in the art at the time of the invention to use the retardation technique to the layer to change the brightness and color of the pixel unit, as taught by Nishino, with Ben-David's invention, with the motivation of the KSR principles above and that by doing so, a desired color can be achieved with a more simple structure, (Nishino, Columns 1-2, Lines 62-22).

Ben-David and Nishino teach in Claim 4:

The color display element according to claim 1, wherein a voltage making the light passing through the liquid crystal layer assume magenta is applied to the first sub-pixel, and a voltage making the light passing through the liquid crystal layer assume a maximum brightness of green is applied to the second sub-pixel, whereby the unit pixel displays white color. (**Figures 12/12B and [0085] disclose that when the first and second sub-pixel are vertically paired, they can produce white light. Obviously, this is at a maximum brightness/gray scale application**)

Ben-David teaches in Claim 5:

The color display element according to claim 1, wherein the first sub-pixel has a magenta color filter. (**Figures 12A/12B and for purposes of interpretation, the first sub-pixel is a magenta. Also, please see various disclosures in Ben-David with regards to the filters on the sub-pixels**)

Ben-David teaches in Claim 7:

The color display element according to claim 5, wherein a voltage in the range within which the chromatic color changes is applied to the first sub-pixel, to display a color as a result of overlapping the chromatic color and a color of the magenta color filter with each other. (**Figures 12/12B and [0085] disclose that when the first and second sub-pixel are vertically paired, they can produce white light. This satisfies the limitation of requiring an overlap of the two sub-pixels to form a color**)

Ben-David teaches in Claim 8:

The color display element according to claim 5, wherein a voltage making the lights passing through the liquid crystal layers have a maximum brightness in the range within which a brightness of the light is variable is applied to the first and second sub-pixels, whereby the unit pixel displays white color. (**The same reasoning that applies to Claim 4 also applies here. Figures 12/12B and [0085] disclose that when the first and second sub-pixel are vertically paired, they can produce white light. Obviously, this is at a maximum brightness/gray scale application**)

Ben-David and Nishino teach in Claim 9:

The color display element according to claim 5, wherein modulations of a same gray level in the range within which a brightness of the light is variable are applied to the first and second sub-pixels respectively, whereby an achromatic color of half tone is displayed in the unit pixel. **([0085] discloses that white can be displayed by modulating the first and second sub-pixels together. Please note that one of ordinary skill in the art would realize to be able to display achromatic colors and Ben-David suggests doing so given the particular alignment of the various sub-pixels. Also, please note the combination with Nishino)**

Ben-David teaches in Claim 21:

A method for driving a color display element which contains a liquid crystal layer, a retardation of which changes in accordance with an applied voltage, the color display element being comprised of a unit pixel comprised of a plurality of sub-pixels comprising a first sub-pixel and a second sub-pixel, the second sub-pixel having a green color filter **(Figures 12A/12B, [0085]-[0087] disclose RGB sub-pixels in row A with a corresponding CMY sub-pixels in row B. It is designed so that the G sub-pixel corresponds to the M sub-pixel. For purposes of interpretation, please read the first sub-pixel as the magenta sub-pixel and the second sub-pixel as the green sub-pixel. Also, please see various disclosures in Ben-David with regards to the filters on the sub-pixels, such as [0011]**), which comprises the steps of:

brightness-modulation voltage range to modulate the first sub-pixel to change the brightness of light passing therethrough, wherein plural chromatic colors of light including red and blue and not including green pass through the first sub-pixel in response to the changing the

applied voltage within the first sub-pixel (**As discussed above, modulation by applying a voltage is suggested in [0059] and again, is obvious in an LCD. Differences in voltages account for differences in brightness, at least in part. As for the range of chromatic colors for this first sub-pixel, it is well known that magenta is represented as red and blue (hence why it corresponds to the green sub-pixel as a pair, so they can make white). Thus, this sub-pixel is capable of red and blue color outputs. Also, please note that chromatic and achromatic colors and being able to produce at these boundaries is capable given Ben-David's CIE charts, such as Figures 5A/5B**), and

applying voltage to the liquid crystal layer of the second sub-pixel with the green color filter in a second sub-pixel, brightness-modulation voltage range to modulate the second sub-pixel to change the brightness of light passing through the liquid crystal layer of the second sub-pixel, wherein the light passing through the liquid crystal layer of the second sub-pixel is achromatic when the voltage is in the second sub-pixel (**As discussed above, modulation by applying a voltage is suggested in [0059] and again, is obvious in an LCD. Differences in voltages account for differences in brightness, at least in part. The second sub-pixel is the green sub-pixel as noted above. Also, please note that chromatic and achromatic colors and being able to produce at these boundaries is capable given Ben-David's CIE charts, such as Figures 5A/5B and please note the combination below**); but

Ben-David does not teach "applying voltage to the liquid crystal layer of the first sub-pixel in a first sub-pixel, chromatic-modulation voltage range to modulate the retardation of the liquid crystal layer of the first sub-pixel to change the color of light passing through the liquid crystal

layer of the first sub-pixel and applying voltage to the liquid crystal layer of the first sub-pixel in a first sub-pixel" and also does not explicitly teach of the liquid crystal layer having a retardation capability, which causes changes the chromatic-modulation and brightness-modulation processes.

However, in liquid crystal displays, it is obvious, if not inherent, that the LCD layer is deformed (read as retarded) with respect to the molecules when a voltage is applied to it. Respectfully, this is standard in a liquid crystal display. Furthermore, several types of LCDs, such as ECB and twisted nematic displays, often have this retardation ability as a key part of the invention, as well as being able to change the color of a sub-pixel by varying the voltage to the unit. It is further known that these various types of LCDs can reasonably be combined/manipulated to incorporate the teachings of various types of LCDs with other ones and Ben-David's is a generic type, i.e, doesn't teach away from a specific type.

To emphasize, in the same field of endeavor, liquid crystal displays, Nishino teaches of a birefringence type LCD which has two retardation plates which may be used as part of the color adjusting optical elements, (Nishino, Column 2, Lines 50-54). In this paragraph, the deformation, causing the refractive index changes, results in a change in thickness and a different color can be selected, as well as the brightness being changed for a particular color. Respectfully, the same voltage can be used to change the brightness and at certain voltage levels, change the color, as is obvious. Please see Figure 3 which shows the different voltage ranges associated with the various colors. Nishino is concerned with pixel units, but as one of ordinary skill in the art

would realize, this could be applied to a sub-pixel structure as well, especially given the advances in pixel technology. Combined with Ben-David, there is a teaching of retarding the liquid crystal layer with the purpose of applying a voltage to both change the brightness of the selected color (as is readily known in the art) as well as being able to change the color (Nishino's teaching to reinforce something known in the art). Also please note that this is being applied to the first sub-pixel of Ben-David as the claim language calls for only that sub-pixel to undergo a color change, so Ben-David's first sub-pixel structure can be replaced with Nishino's pixel structure with brightness/color control without the need of a color filter, a solution Nishino seeks. Several KSR principles can be applied here, such as known technique (the retarding of the LCD layer is well known when applying voltages to effect color changes in the pixels), simple substitution of parts (being able to implement a known driving technique without destroying the combination), teaching/suggestion/motivation in the prior arts (the retardation suggestions by Nishino), etc.

Therefore it would be obvious to one of ordinary skill in the art at the time of the invention to use the retardation technique to the layer to change the brightness and color of the pixel unit, as taught by Nishino, with Ben-David’s invention, with the motivation of the KSR principles above and that by doing so, a desired color can be achieved with a more simple structure, (Nishino, Columns 1-2, Lines 62-22).

Response to Arguments

7. Applicant's arguments considered, but are respectfully considered to be moot in grounds of new rejection(s).

Applicant is thanked for the interview to discuss the case and to discuss the differences between the previous rejection and the claimed invention. Due to the discussion and the new/supplemental claim amendments, the previous rejection has been withdrawn and a new one has been given.

Specifically, it seems from the interview, the claim amendments, and the arguments, that Applicant does not feel the Ben-David or the Abileah reference teach of the ability to change colors via voltage application, but rather just the brightness. However, this feature is well known in the art of liquid crystals, especially in ECB, as Applicant admits in [0008], as well as various other types of LCD panels. As a result, a new rejection has been given to emphasize this and please note the Nishino reference. As a result, Applicant's arguments are moot at this time.

Conclusions

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DENNIS P. JOSEPH whose telephone number is (571)270-1459. The examiner can normally be reached on Monday-Friday, 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on 571-272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander S. Beck/
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